

WHAT IS CLAIMED IS:

1. An intracorporeal site marker for marking a selected site within tissue of a patient's body, comprising:

(a) an ultrasound detectable body including boundaries having a high contrast in acoustical impedance when the marker is placed in tissue of the selected site, so as to efficiently reflect ultrasound during ultrasound imaging; and

(b) a body shape which is recognizably artificial when the marker is subject to ultrasound or X-ray imaging, so as to be readily distinguishable from biological features within the tissue site.

2. The site marker of Claim 1, wherein the body has an interior configuration which includes a plurality of distinct reflective interior boundaries having a high contrast in acoustical impedance to enhance an acoustic signal.

3. The site marker of Claim 2, wherein the interior configuration is selected from the group consisting essentially of from a porous configuration, a bubble-filled configuration; a bead-filled configuration, a particle-filled configuration, a hollow configuration; an internally-fractured configuration; and combinations thereof.

4. The site marker of Claim 1, wherein the body has a surface contour which includes a plurality of distinct surface portions which provide a plurality of distinct reflective boundaries with the tissue of the selected site to enhance an acoustic signal.

5. The site marker of Claim 4, wherein the surface contour is selected from the group consisting essentially of a coiled contour; multi-planar contour; a faceted contour; a notched contour, a grooved contour; a lobulate contour; and combinations thereof.

6. The site marker of Claim 1, wherein the body has a body surface texture which includes a plurality of distinct reflective boundaries with the tissue of the selected site to enhance an acoustic signal.

7. The site marker of Claim 6, wherein the surface texture is selected from the group consisting essentially of a porous texture; a frosted texture; a matte texture; a shot-peened texture; a scored texture; a pitted texture; and combinations thereof.

8. The site marker of Claim 1, wherein at least a portion of the marker comprises a composition selected from the group consisting essentially of metal, ceramic materials, metal oxides, polymer, and composites and mixtures thereof.

9. The site marker of Claim 1, wherein the surface contour is selected from the group consisting essentially of a generally cylindrical shape, a cruciform shape, a polyhedral shape a stellate shape, a generally spherical shape, a coil shape, and the shape of a known symbol.

10. The site marker of Claim 2, wherein the body comprises a porous composition having a porous surface texture, and the interior configuration comprises a plurality of internal pores of the porous composition.

11. The site marker of Claim 10, wherein the average size of the plurality of internal pores of the porous composition ranges from about 5 micrometer to about 40 micrometer.

12. The site marker of Claim 10, wherein the porous composition is selected from the group consisting essentially of sintered metal, polyethylene, and polytetrafluoroethylene.

13. The site marker of Claim 10, wherein the surface contour is generally cylindrical.

14. The site marker of Claim 13, wherein the diameter of the generally cylindrical body is from about 0.5 mm to about 5 mm; and the length of the generally cylindrical body is from about 1 to about 10 times the diameter.

15. The site marker of Claim 14, wherein the diameter of the generally cylindrical body is about 1.5 mm; and the length of the generally cylindrical body is from about 5 to 7 times the diameter.

16. The site marker of Claim 10, wherein the body has a surface contour which includes a plurality of distinct reflective surface portions of the body to enhance an acoustic signal.

17. The site marker of Claim 16, wherein the surface contour includes at least two generally planar body portions having generally flat surfaces.

18. The site marker of Claim 17 wherein the surface contour is a generally polyhedral solid having multiple planar surface portions.

19. The site marker of claim wherein the body has a maximum dimension of about 0.5 mm to about 5 mm.

20. The site marker of Claim 17, wherein the body is generally cruciform in cross-section, and at least one of the flat surfaces is aligned substantially perpendicularly to at least one other of the flat surfaces, so as to reinforce an acoustic signal reflected from the perpendicularly aligned surfaces.

21. The site marker of Claim 4, wherein the body comprises a coil having a least one helical groove.

22. The site marker of Claim 21, wherein the body comprises stainless steel.

23. The site marker of Claim 21, wherein the diameter of the coil is from about 0.5 mm to about 5 mm; and the length of the coil is from about 1 to about 10 times the diameter.

24. The site marker of Claim 6, wherein the body is generally spherical.

25. The site marker of Claim 24, wherein the surface texture is selected from the group consisting of a frosted texture; a matte texture; a shot peened texture; and combinations thereof.

26. The site marker of Claim 25, wherein the body is formed of stainless steel.

27. The site marker of Claim 25, wherein the body has a diameter of from about 0.5 mm to about 4 mm.

28. The site marker of Claim 1, wherein the marker includes at least one haptic element mounted to the body and extending outward therefrom, so

as to engage tissue adjacent the selected tissue site to resist migration of the marker.

29. The site marker of Claim 1, wherein the marker includes bio-compatible adhesive bonded to the surface of the body, so as to adhere to tissue adjacent the selected tissue site to resist migration of the marker.

30. The site marker of Claim 29, wherein the adhesive is selected from the group consisting essentially of polyurethane, polyacrylic compound, fibrin glue, collagen adhesive, polyhydroxymethacrylate, and mixtures thereof.

31. The site marker of Claim 1, wherein the marker includes an bio-compatible encapsulating element mounted surrounding the body and enclosing at least a portion of the body.

32. The site marker of Claim 31, wherein the encapsulating element comprises a composition selected from the group consisting of gelatin, reconstituted collagen material, polymeric material, and mixtures and composites thereof.

33. The site marker of Claim 31, wherein the encapsulating element comprises a bio-compatible adhesive, so as to adhere to tissue adjacent the selected tissue site to resist migration of the marker.

34. An intracorporeal site marker for marking a selected site within tissue of a patient's body, comprising:

(a) an elongated body of gel having a metallic band disposed at least partially surrounding the body of gel which is recognizably artificial when the

marker is subject to ultrasound or X-ray imaging, so as to be readily distinguishable from biological features within the tissue site.

35. A method of marking a selected intracorporeal tissue site for a subsequent medical procedure, comprising:

a. providing at least one marker having an ultrasound detectable body having boundaries which provide a high contrast in acoustical impedance when placed in tissue of the selected site, so as to efficiently reflect ultrasound during ultrasound imaging, and a body shape recognizably artificial when the marker is subject to ultrasound imaging, so as to be readily distinguishable from biological features within the tissue site; and

b. implanting the marker adjacent the tissue site, so that the body is detectable when subject to ultrasound imaging.

36. The method of Claim 35, wherein the step of providing at least one marker includes the body having at least one of:

a. a surface texture which includes a plurality of distinct reflective boundaries with the tissue of the selected site to enhance an acoustic signal;

b. a surface contour which includes a plurality of distinct surface portions which provide a plurality of distinct reflective boundaries with the tissue of the selected site to enhance an acoustic signal; and

c. an interior configuration which includes a plurality of distinct reflective interior boundaries having a high contrast in acoustical impedance to enhance an acoustic signal.

37. The method of Claim 36, wherein the step of implanting the at least one marker includes the step of inserting the marker through a biopsy needle device, the device being previously inserted into the tissue site in the course of a biopsy procedure.

38. The method of Claim 37, wherein the step of inserting the at least one marker through a biopsy needle device includes:

a. the biopsy needle device is a vacuum assisted large core biopsy device;

b. the insertion of the marker includes:

i. loading the marker into a marker applicator device having an elongated marker insertion tube for holding the marker, the tube having a distal tip and a piston housed within the tube for expelling the marker from the tip;

ii. inserting the marker insertion tube through the large core biopsy device until the tip is adjacent the tissue site; and

iii. depressing the piston to expel the at least one marker from the tube to implant adjacent the tissue site.

iv. removing the marker applicator device and the large core biopsy device from the tissue site following the implant of the at least one marker.

39. The method of Claim 36, wherein the step of providing at least one marker includes that the body comprises a sintered composition having a porous surface texture and a plurality of internal pores.

40. The method of Claim 39, wherein the step of providing at least one marker includes that the average size of the plurality of internal pores ranges from about 5 micrometers to about 40 micrometers.

41. The method of Claim 39, wherein the step of providing at least one marker includes that body has a largest dimension of from about 0.5 mm to about 5 mm.